THE ECONOMIC IMPACT OF THE DIGESTIVE DISEASES ACROSS THE EU MEMBER STATES. THE COSTS ANALYSIS IN CHOLECYSTECTOMY

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Abstract: *United European Gastroenterology provide wide studies and researches on the economic impact of the digestive diseases across the countries that are members of the European Union, very useful in planning health services, in making the case for investment in research where there are clear gaps in knowledge, and in reflecting the economic differences across the EU member states in the funding available to support health services. These studies reflect that there are important disparities in the accessibility to high-quality healthcare even among the industrialized countries. Out of all the digestive diseases, the gallstone disease is one of the most common and expensive of the health problems, in industrialized countries, like those of the European Union are. In general, symptomatic or complicated gallstone disease is treated by cholecystectomy, with surgical removal of the gallbladder. The advent of laparoscopic cholecystectomy has revolutionized the management of the gallstone disease, causing an increase in the rate of cholecystectomies. This study represents an analysis of the hospitalization costs involved by two surgical treatment options: laparoscopic cholecystectomy and open cholecystectomy. The investigation of the costs was done according to the type of intervention chosen and comprised the direct costs of hospitalization, including diagnostic tests and general expenses of medical assistance, pharmaceutical and medical supplies. The results are based on the analysis of the costs of cholecystectomies in the surgical department of the Emergency County Hospital Oradea for the year 2014 (781 cases). The average cost per hospitalized patient was 1.970 RON, lower in patients with laparoscopic cholecystectomy (1.579 RON). The average cost per patient with open cholecystectomy was 55% higher than for laparoscopic surgery (2.442 RON). Even if the laparoscopic operation cost is higher because of the equipment it uses, the reduction of the number of complications and of the average length of hospitalization results in a significant reduction of the hospitalization costs.*

Keywords: *hospitalization costs, digestive diseases, Gallston desease, laparoscopic cholecystectomy, open cholecystectomy.*

JEL Codes: H51, I11, I15, P36

Introduction

United European Gastroenterology provide wide studies and researches on the economic impact of the digestive diseases across the countries that are *members* of the European Union, very useful in planning health services, in making the case for investment in research where there are clear gaps in knowledge, and in reflecting the economic differences across the EU member states in the funding available to support health services. These studies reflect that there are important disparities in the accessibility to

high-quality healthcare even among the industrialized countries. Out of all the digestive diseases, the gallstone disease is one of the most common and expensive of the health problems in industrialized countries, with an overall prevalence of 10-20% (Everhart, 1999).
Available epidemiological data show a significant variation in the prevalence of this disease among the population, depending on ethnicity. It was noticed a higher frequency in the Caucasian, Hispanic population and among the inhabitants of Western America, and lower in Eastern Europe, African-American and Japan (Farthing, 2014)
Numerous studies have shown that the formation of gallstones is determined by several factors, some of them unchangeable: ethnicity, age, sex, other changeable: diet, sedentary lifestyle, obesity, rapid weight loss and the use of some medicines (Stinton, 2012). The advent of laparoscopic cholecystectomy has revolutionized the management of gallstone diseases, causing an increase in the rate of cholecystectomies (Shaffer, 2005; Marshall, 1994).
Laparoscopic cholecystectomy is less invasive and with lower surgical risk compared to the classical surgical procedure, which resulted in increasing the number of surgeries, especially among patients at high risk for conventional intervention and of those with mild symptoms (Shaffer, 2005; ARCE, 2013).
Even if the progress in the medical field influences positively the postoperative evolution of patients open operated, the laparoscopic procedure is preferable when it is appropriate for the patient because it is superior in terms of patient recovery time, pain and complications. The cost of a laparoscopic intervention is higher than that of a classical intervention this being determined by the specific equipment and tools used in this type of surgery, but because of the advantages listed above, the total direct costs can be significantly reduced by using this procedure (Kang, 2003; Strasberg, 1993; Cook, 1994, ARCE, 2013).
Given the high prevalence of this disease and the surgical treatment options, this study attention is directed towards the analysis of the hospitalization costs involved by laparoscopic cholecystectomy and open cholecystectomy.

Material and methods
We analysed the costs of cholecystectomies in surgical department, of the Emergency County Hospital Oradea for the year 2014. In the studied period 5.979 cases were discharged from surgery, the percent of patients with cholecystectomy was 13.06% (781 cases) as it can be seen in Figure 1.

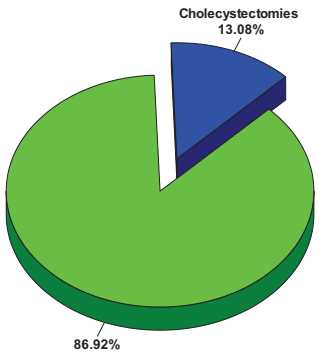

Figure 1: The percent of patients with cholecystectomy

The investigation of the costs was done according to the type of intervention chosen and comprised direct costs of hospitalization, including diagnostic tests and general expenses of medical assistance, pharmaceutical and medical supplies.
Statistical analysis was performed using SPSS 19. We calculated average parameters, frequency ranges, standard deviations, tests of statistical significance by Student method (t test) and χ^2

Results
Of the 781 cases, 72.60% were laparoscopic cholecystectomies and 27.4% open cholecystectomies, of which 2.43% after the attempted laparoscopic cholecystectomy (table 1).

Table 1: The distribution according to the type of surgery

Type of intervention	No. of cases	%
Laparoscopic cholecystectomy	567	72.60
Open cholecystectomy	214	27.40

The prevalence of complications was 9.70% among the patients with laparoscopic cholecystectomy and 21.96% among the patients with open cholecystectomy (p<0.001), especially in elderly patients (table 2).

Table 2: The prevalence of complications related to the type of surgery

Type of intervention	No. of cases	%
Laparoscopic cholecystectomy	55	9.70
Open cholecystectomy	47	21.96

The average length of hospitalization was 5.04 days, the lowest being for the laraposcopic cholecystectomy (3.92 days) significantly lower than the open cholectystectomy (7.14 days) (p=0.021) (table 3 and figure 2).

Table 3: The average length of hospitalization

Type of intervention	Minimum	Maximum	Average
Laparoscopic cholecystectomy	1	9	3.92±1.37
Open cholecystectomy	3	12	7.14±2.06
Total	**1**	**19**	**5.04±2.33**

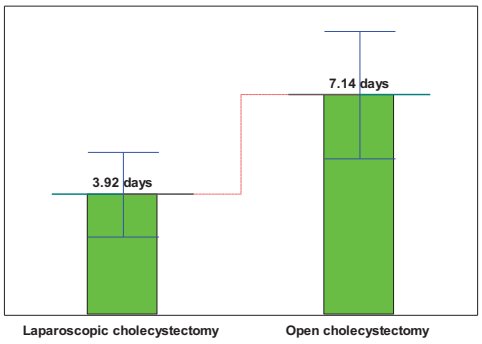

Figure 2: The average length of hospitalization

The average cost per hospitalized patient was 1.970 RON, lower in patients with laparoscopic cholecystectomy (1.579 RON). The average cost per patient with open cholecystectomy was 55% higher than for laparoscopic surgery (2.442 RON). The cost of laparoscopic cholecystectomy in patients without complications was 1.020 RON/patient vs. 1.351 RON in open cholecystectomy (32.45% higher), and 1.608 RON vs. 2.732 RON in patents with complications (69.90% higher). The results are presented in table 4 and figure 3.

Table 4: The costs of cholecystectomy

Type of intervention	Cost/patient (RON)	Cost of drugs and sanitary materials / patient (RON)
Laparoscopic cholecystectomy	1.579	323
Without complications	1.020	272
With complications	1.608	464
Open cholecystectomy	2.442	470
Without complications	1.351	375
With complications	2.732	746
Total	**1.970**	**399**

The cost per patient include: drugs and medical supplies, the cost of medical tests and procedures (radiological and / or functional examinations), accomodation and meal costs. The cost of patients with complications are greater because both, drugs and sanitary materials consumption, are higher, and also the number of days of hospitalization / accommodation + meals).
The laparoscopic interventions are minimally invasive; therefore, the consumption of material is less, and the incidence of complications lessen, thereby the consumption of drugs and length of stay is decreasing.

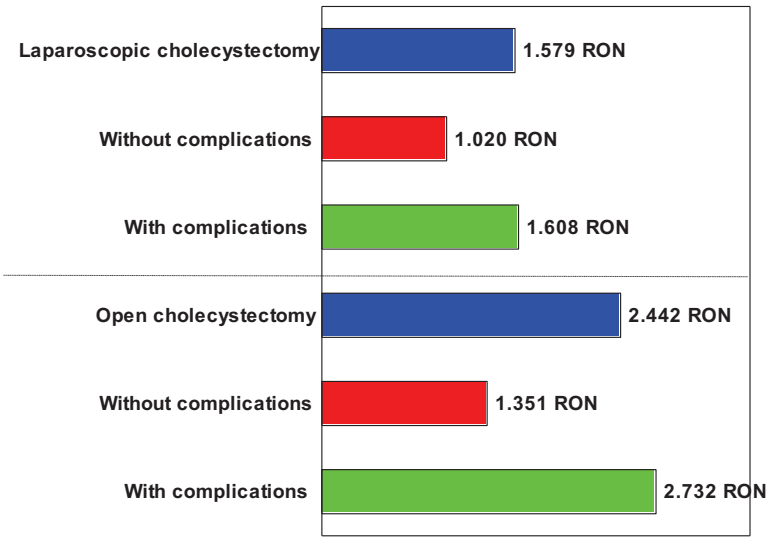

Figure 3: The costs / pacient of cholecystectomy

The costs of drugs and sanitary materials were 399 RON, with 46% higher in patients with open cholecystectomy vs. laparoscopic surgery (470 RON vs. 323 RON). In patients without complications the costs was 37.88% higher, and in patients with complications - 60.78% higher.

Conclusions

There are significant differences between laparoscopic cholecystectomies and open cholecystectomies in terms of cost, which is mainly due to differences in postoperative care costs incurred by hospitals.

The cholecystectomy costs depend primarily on the type of surgery and age of patients, which leads to more frequent complications.

Even if laparoscopic operation cost is higher, the reducing of the number of complications and of the average length of hospitalization results in a significant decreasing of the hospitalization costs.

The economic evaluation found that laparoscopic cholecystectomy involves lower costs and better outcomes than open cholecystectomy.

Given the advantages presented by the laparoscopic surgery interventions vs. opened surgery interventions, it can be estimated that, with the increasing number of laparoscopic surgery (surgical pathology whatever), would significantly decrease the costs / patient.

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